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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/789,194	02/26/2004	Bowie G. Keefer	6454-68030-01	6958

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KLARQUIST SPARKMAN, LLP
121 SW SALMON STREET
SUITE 1600
PORTLAND, OR 97204

EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	**PAPER NUMBER**
1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/04/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/789,194	KEEFER ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/21/06 7/30/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Interpretation

1. It is noted that the "means" clauses in instant claims 1-15 are not considered to invoke 35 USC 112, sixth paragraph, since none of the means clauses use the "means for..." construction. See MPEP 2181.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-7 and 12-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Keefer (U.S. Patent 7,097,925). See in particular claims 1-12 of the reference. Regarding the limitation in instant claim 1 that the module is "operable to...separate and enrich usable fuel gas from the exhaust gas by displacement purge adsorptive means," the pressure swing module of the reference is capable of being operated in this manner and thus meets the claim language. In particular, a displacement purge gas can be supplied to the module to regenerate the adsorbent. See MPEP 2114.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

4. Claims 1, 3-5, and 12-15 are rejected under 35 U.S.C. 102(a) and (e) as being anticipated by Keefer et al (U.S. Patent 7,087,331). See in particular Figures 6-9 of the reference. Regarding the limitation in instant claim 1 that the module is "operable to...separate and enrich usable fuel gas from the exhaust gas by displacement purge adsorptive means," the pressure swing module of the reference is capable of being operated in this manner and thus meets the claim language. In particular, a displacement purge gas can be supplied to the module to regenerate the adsorbent.

Thus, the instant claims are anticipated.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-7 and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer et al (U.S. Pre-Grant Publication No. 2002/0004157).

The reference teaches a rotary pressure swing adsorption module connected to the anode outlet of a fuel cell and configured to recycle fuel back to the anode inlet (see [0023]). Regarding the limitation in claim 1 that the module is "operable to...separate and enrich usable fuel gas from the exhaust gas by displacement purge adsorptive means," the module of the reference is capable of being operated in this manner and thus meets the claim language. In particular, a displacement purge gas can be supplied to the module to regenerate the adsorbent.

The reference does not teach that the fuel cell is a high temperature fuel cell such as a solid oxide or molten carbonate fuel cell, as recited in claims 1, 3, 4, 12, 14, and 15.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use these types of fuel cells in the system of Keefer '157. Solid oxide and molten carbonate fuel cells are known to have high operating efficiencies, and as such, the skilled artisan would be motivated to use these types of fuel cells in the system of Keefer '157.

Regarding claims 2 and 6, it would be obvious to use a second rotary PSA module to further purify the fuel gas component.

Regarding claim 7, it would be obvious to route the purified hydrogen to a storage apparatus (a similar apparatus for oxygen is disclosed in [0145]).

7. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer et al '157 as applied to claims 1-7 and 12-15 above, and further in view of Keefer et al (U.S. Patent 6,902,602).

Keefer '157 does not expressly teach a heat exchange means operable to deliver a heated displacement purge gas to the rotary adsorption module, as recited in claim 8.

Keefer '602 is directed to an apparatus for gas separation by combined pressure swing and displacement purge. A displacement purge gas (identified by the reference as component C) can be fed to the apparatus, and may be heated beforehand (see col.2, line 20). The apparatus is specifically designed to separate hydrogen (see abstract).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the combined pressure swing adsorption and displacement purge apparatus of Keefer '602 as the hydrogen separation means of Keefer '157. At column 2, line 24 et seq., the '602 reference discusses the relative advantages of its apparatus over conventional displacement purge processes. As such, the artisan would have sufficient motivation to use the apparatus of the '602 reference in the system of Keefer '157.

The 'Keefer '602 reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a

date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

8. Claims 2, 6, and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer et al (7,087,331)

The '331 patent is applied to claim 1 for the reasons stated above. However, the reference does not expressly teach a second gas separation system as recited in claim 2 or a high pressure hydrogen storage system as recited in claim 7.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to incorporate these features into the system of Keefer '331. Regarding the second gas separation device, it would be obvious to include such a device to further purify the hydrogen in the system. It has generally been held that the duplication of parts is not sufficient to patentably distinguish over a reference (MPEP 2144.04). As such, the addition of a second hydrogen separation device is not

considered to distinguish over the reference. Further, the use of a high pressure storage device to store some of the purified hydrogen would be obvious to a skilled artisan. Such a device would be useful in portable applications where intermittent use of hydrogen in the system could be expected.

9. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keefer et al '331 in view of Keefer et al (U.S. Patent 6,902,602).

Keefer '331 is applied for the reasons stated above. However, Keefer '331 does not expressly teach a heat exchange means operable to deliver a heated displacement purge gas to the rotary adsorption module, as recited in claim 8.

Keefer '602 is directed to an apparatus for gas separation by combined pressure swing and displacement purge. A displacement purge gas (identified by the reference as component C) can be fed to the apparatus, and may be heated beforehand (see col.2, line 20). The apparatus is specifically designed to separate hydrogen (see abstract).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the combined pressure swing adsorption and displacement purge apparatus of Keefer '602 as the hydrogen separation means of Keefer '331. At column 2, line 24 et seq., the '602 reference discusses the relative advantages of its apparatus over conventional displacement purge

processes. As such, the artisan would have sufficient motivation to use the apparatus of the '602 reference in the system of Keefer '331.

Double Patenting

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-7 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-30 of U.S. Patent No. 7,097,925. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '925 application anticipate the instant claims.

12. Claims 8-11 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-30 of U.S. Patent No. 7,097,925 in view of Keefer et al (U.S. Patent 6,902,602). The Keefer '602 reference is applied for the reasons stated above.

13. Claims 1-7 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-92 of U.S. Patent No. 7,087,331. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '331 application anticipate at least instant claim 1.

14. Claims 8-11 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-92 of U.S. Patent No. 7,087,331 in view of Keefer et al (U.S. Patent 6,902,602). The Keefer '602 reference is applied for the reasons stated above.

15. Claims 1-7 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-16 of U.S. Patent No. 6,921,597. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claimed "high temperature" fuel cell, not recited in the claims of the '597 patent, would be an obvious addition to the claims. See rejection over 2002/0004157 above.

16. Claims 8-11 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-16 of U.S. Patent No. 6,921,597 in view of Keefer et al (U.S. Patent 6,902,602). The Keefer '602 reference is applied for the reasons stated above.

17. Claims 1-11 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1 and 3-9 of copending Application No. 10/389541. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '541 application anticipate at least claim 1. The further elements of the instant claims not recited in the '541 claims, such as the heat exchanger in instant claim 6, would also be obvious to a skilled artisan.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

18. Claims 1-7 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 4, 7, and 12-16 of copending Application No. 10/671750. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the '750 application anticipate at least claim 1.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

19. Claims 8-15 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1, 4, 7, and 12-16 of copending Application No. 10/671750 in view of in view of Keefer et al (U.S. Patent 6,902,602). The Keefer '602 reference is applied for the reasons stated above.

This is a provisional obviousness-type double patenting rejection.

Conclusion

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

J.C.

Jonathan Crepeau
Primary Examiner
Art Unit 1745
December 26, 2006